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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/809,043 | 03/16/2001 | Nobuo Aoi | 0819-0524 | 5601 |

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| EXAMINER | |
|---|---|
| TOLEDO, FERNANDO L | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2823 | |

DATE MAILED: 12/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/809,043 | AOI, NOBUO | |
| | Examiner | Art Unit | |
| | Fernando Toledo | 2823 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *22 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disp sition of Claims**

4)☒ Claim(s) *7-9,13 and 18-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *20 and 22-26* is/are allowed.

6)☒ Claim(s) *7-9,13,18,19 and 21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 March 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

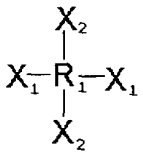
1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 7 – 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Brown et al. (U. S. patent 5,962,113).

In re claim 18, Brown in the U. S. patent 5,962,113; figures 1 – 8 and related text discloses polymerizing first cross-linking molecules having a three-dimensional structure and second cross-linking molecules having a two-dimensional structure to form an interlayer dielectric film composing a three-dimensionally polymerized organic polymer having a number of molecular pores (Columns 3 and 4); wherein the first cross-linking molecules are first organic molecules having a three or more sets of functional groups in one molecule, the second cross-linking molecules are second organic molecules having two sets of functional groups in one molecule, and the three-dimensionally polymerized organic polymer is formed by binding the three or more sets of functional groups of each of the first organic molecules and the two sets of functional groups of each of the second organic molecules together (columns 3 – 7).

3. In re claim 7, Brown discloses the first organic molecules are represented by [chemical formula 1]

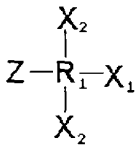


(wherein $R_1$ is a first organic skeleton, $X_1$ is a first set of functional groups, and $X_2$ is a set of a second set of functional groups, $X_1$ and $X_2$ being same or different type), the second organic molecules are represented by [chemical formula 2]

$$Y_1—R_2—Y_2$$

(wherein $R_2$ is a second organic skeleton, $Y_1$ is a third set of functional groups, and $Y_2$ is a fourth set of functional groups, $Y_1$ and $Y_2$ being same or different in type), the three-dimensionally polymerized organic polymer is formed by binding the first set of functional groups and the third set of functional groups together and binding the second set of functional groups and the fourth set of functional groups together, and the molecular level pores are formed in regions surrounded by the first organic skeleton and the second organic skeleton (Columns 3 – 7).

4. In re claim 8, Brown discloses the first organic molecules are represented by [chemical formula 3]



(wherein $R_1$ is a first organic skeleton, $X_1$ is a first set of functional groups, and $X_2$ is a set of a second set of functional groups, and Z is a third set of functional groups, $X_1$ and $X_2$ being same or different type), the second organic molecules are represented by [chemical formula 4]

$$Y_1—R_2—Y_2$$

(wherein $R_2$ is a second organic skeleton, $Y_1$ is a fourth set of functional groups, and $Y_2$ is a fifth set of functional groups, $Y_1$ and $Y_2$ being same or different in type), the three-dimensionally polymerized organic polymer is formed by binding the first set of functional groups and the fourth set of functional groups together and binding the second set of functional groups and the fifth set of functional groups together, and then binding the third set of functional groups of the several units together and the molecular level pores are formed in regions surrounded by the first organic skeleton and the second organic skeleton (Columns 3 – 7).

5. In re claims 9 and 13, Brown teaches forming a barrier film on the interlayer dielectric film (column 2); forming a mask on the surface of the barrier film (column 8); forming a concave portion in the surface of barrier film and the interlayer dielectric film by etching the surface barrier film and the interlayer dielectric film using the mask (column 8); and forming an interconnection made of a metal material by filling the concave portion with the metal material (column 8).

6. In re claim 19, Brown teaches wherein the three-dimensionally polymerized organic polymer has a unit with a diamond structure (Column 3).

7. In re claim 21, Brown teaches wherein the three-dimensionally polymerized organic polymer has a basket-like structure (Column 3).

***Allowable Subject Matter***

8. Claims 22 – 26 are allowed over the prior art of record.

***Response to Arguments***

9. Applicant's arguments filed 22 October 2003 have been fully considered but they are not persuasive for the following reasons.

Applicant contests that the process of Brown does not meet the requirements of claim 18. "The result is that at least some of the functional groups of the first cross-linking molecule will not bond to the functional groups of the second cross-linking molecule of the organic polysilica during the second cross condensation of the remaining functionalized groups of the initially formed polyimide (since some of the functional groups of the first cross-linking molecule will be bound during the chain extension/imidization of the first process step).

Examiner respectfully submits that the functional groups of the first molecule (alkoxysilylalkyl end capped polyamic ester) do not include the –NH but the –R attached to the –NH group. The –NH group will cause the extension and imidization of the polyamic chain.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fernando Toledo whose telephone number is 703-305-0567. The examiner can normally be reached on Mon-Fri 8am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703-306-2794. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7382.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

George Fourson
Primary Examiner
Art Unit 2823

FToledo